IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: 23100.36 Bill H. McAnalley, et al.	§	Attorney Dock t No.
Serial No.: 09/242,215	§	Confirmation No. 9780
Filed: February 8, 1999	§	Customer No. 27683
For: COMPOSITIONS OF PLANT CARBOHYDRATES AS DIETARY SUPPLEMENTS	§	Group Art Unit: 1654
	§	Examiner: M. Flood

#28
4/22/03

DECLARATION UNDER RULE 37 C.F.R. § 1.132

1. My name is Robert K. Murray. I am a Professor (Emeritus) of Biochemistry at the University of Toronto, Toronto, Ontario, Canada. I received my medical degree (M.B., Ch.B.) from the University of Glasgow Medical School in 1956. I received a M.S. degree from the Department of Physiology of the University of Michigan in 1958. I received a PhD degree from the Department of Biochemistry of the University of Toronto in 1961.

2. Since 1961, I have worked continually in the field of Biochemistry, until my retirement in 1998. Since 1998, I have taught Biochemistry part-time at the University of Toronto and continue to update two previously published textbooks as well as maintain an active interest in glycobiology.

3. Since 1961, I have been on staff in the Department of Biochemistry at the University of Toronto and currently hold the position of Professor (Emeritus).

4. I have authored some 60 refereed publications, and a number of others, which are detailed in my Curriculum Vitae, a copy of which is attached.

5. My research interests include the biochemistry of glycoproteins, glycolipids, the endoplasmic reticulum and cancer.

6. I have read and understand U.S. Patent Application Serial No. 09/242,215 to McAnalley et al. (the "McAnalley Application"), U.S. Patent No. 4,871,557 to Linscott

("Linscott"), U.S. Patent No. 5,021,560 to Montreuil et al. ("Montreuil"), "Analysis of the Isolated Hyalin Layer of Sea Urchin Embryos", Developmental Biology 27, 494-503 (1972) by Citkowitz ("Citkowitz") and U.S. Patent No. 3,947,601 to Ortega ("Ortega").

7. I believe that claims 1, 6-17, 22, 27-36 and 40-43 of the McAnalley Application are directed to an important and patentable improvement over the subject matter described in Linscott, Montreuil, Citkowitz and Ortega.

8. I have reviewed the Office Action from the United States Patent and Trademark Office dated December 18, 2002, in the McAnalley Application. I noted the following statement on page 4, lines 9-12 of the Office Action:

> "[N]owhere in the disclosure of Applicant can be found any teaching or suggestion of a treatment of sources of carbohydrates comprising the claimed saccharides to make the saccharides of the claimed invention bioavailable as monosaccharides."

9. Contrary to this statement, the McAnalley Application discloses at page 8, lines 19-23 that in an embodiment of the invention disclosed in the McAnalley Application, the compositions:

> "[I]nclude predigested forms of at least one of the eleven essential carbohydrates. This can include one or all of the following: 1) physical digestion such as shearing or treatment with ultrasound, 2) chemical digestion such as enzymatic digestion, and acid or base hydrolysis, and 3) biological digestion with microbes such as bacteria, fungi or molds."

10. Based on my experience with carbohydrate chemistry, the predigestion of carbohydrates such as tragacanth gum and gum ghatti makes the constituent saccharides of such gums bioavailable as monosaccharides. Accordingly, one skilled in the art would have understood that the predigestion of sources of carbohydrates comprising the claimed saccharides would make the saccharides of the claimed invention bioavailable as monosaccharides.

11. Referring again to the Office Action from the United States Patent and Trademark Office dated December 18, 2002, in the McAnalley Application, I noted the following statement on page 7, lines 15-18 of the Office Action:

> "[N]owhere in the disclosure of Applicant can be found any xpress d teaching of treating water solubl gums to make the constituent saccharides of th gums comprising the disclosed compositions bioavailabl as monosaccharides."

12. Contrary to this statement, and as discussed above, one skilled in the art would have understood that the predigestion of water soluble gums as disclosed by the McAnalley Application at page 8, lines 19-23 would have made the constituent saccharides of the gums comprising the disclosed compositions bioavailable as monosaccharides.

13. In addition, I wish to address the import of the disclosure of Linscott which relates to a granola bar with supplementary dietary fiber. The term "dietary fiber" describes indigenous components of plant materials in the diet which are resistant to digestion by enzymes produced by humans. It is well known in the field of biochemistry and glycobiology that many polysaccharides present in foods consumed by humans are non-digestible (Tungland BC & Meyer D, Comprehensive Reviews In Food Science and Food Safety, 3: 73-92, 2000, attached as Exhibit A). Also, the syrup used in the Linscott formulation included fructose and glucose. Fructose is not found in glycoproteins. These factors demonstrate that the two potential sources of saccharides disclosed by Linscott are actually not suitable for this purpose and reinforce the importance of pre-digestion to monosaccharides, as described and claimed in the McAnalley Application. Thus, it is difficult to perceive the relevance of Linscott to the McAnalley Application, insofar as dietary fiber is resistant to digestion and could not provide the monosaccharides described in the McAnalley Application and fructose is not found in glycoproteins.

14. Referring again to the Office Action from the United States Patent and Trademark Office dated December 18, 2002, in the McAnalley Application, I noted the following statement on page 8, lines 11-13:

> "[T]here is no indication that the constituent saccharides of the glycoprotein taught by Montreuil are not bioavailable as monosaccharides."

15. Contrary to this statement, th Montreuil disclosure relates to an immunogenic fraction active against bilharzios s. It consists of a glycoprot in whose sugar composition is cited. The sugar composition given is what one might predict of many

animal glycoproteins (se Murray et al, Chapt r 56, Harper's Bioch mistry, 25th ed., Appl ton-Lange, 2000, attached as Exhibit B), although no m ntion of N-acetylneuraminic acid (NANA) is mad . The structures of the glycans shown are interesting, and again are typical of a number of glycoproteins. However, they are protein-bound, not pre-digested, and would not provide a reproducible source of dietary sugars. Also, I am not familiar with any work that suggests feeding a non-digested glycoprotein to humans as a possible source of the sugars needed for glycoprotein biosynthesis. Montreuil makes no mention of any nutritional purpose for the disclosed glycoprotein. In fact, the glycoprotein disclosed by Montreuil was to be used for injection to produce antibodies, a purpose completely different from and completely unrelated to the McAnalley Application. Furthermore, the enzymes in the human gut would not fully break down the glycoproteins disclosed by Montreuil because the glycoproteins include beta-linkages which cannot be digested by the enzymes in the human gut.

16. Referring yet again to the Office Action from the United States Patent and Trademark Office dated December 18, 2002, in the McAnalley Application, I noted the following statement on page 9, line 17-18:

> "[T]here is no indication that the constituent saccharides of the referenced compositions taught by Citkowitz and Ortega are not bioavailable as monosaccharides."

17. Contrary to this statement, Citkowitz reports the results of studies on the hyaline layers isolated from Strongylocentrotus purpuratus embryos. They were found to contain >95% protein and 2-3% carbohydrate. Evidence was presented that the hyaline layer consisted of 3 proteins. The sugar composition of the hyaline layers was presented in Table 1 of Citkowitz and generally resembles the composition covered by claim 40 of the McAnalley Application. However, this is not surprising, since the majority of glycoproteins have been found to contain the eight sugars that are listed by Citkowitz. According to Citkowitz, the hydrolysis of the hyaline layers was performed strictly for analytical reasons and no nutritional use of the findings was proposed. I am not familiar with any paper or patent that has suggested the use of hydrolyzed sea urchin eggs as a dietary source of saccharides suitable for human ingestion. I therefore believe that Citkowitz is not relevant to th McAnalley Application.

18. Ort ga disclos s th provision of a food for sea creatures that is compatible with the ecological system which is maintained in salt water aquariums. The food consists largely of sea urchin eggs which have been beaten to yi ld a uniform basis. No information on the composition of the sea urchin eggs is cited in Ortega. In particular, no indication of its contained sugars is mentioned. Also, to the extent that sea urchin eggs include glycoproteins, the beating of the sea urchin eggs disclosed at column 2, lines 34-37 of Ortega would not liberate the constituent monosaccharides from the contained glycoproteins. For these reasons, I cannot discern the relevance of Ortega to the McAnalley Application.

19. The compositions of carbohydrates disclosed and claimed in the McAnalley Application assure the reproducible availability of the monosaccharides that are necessary for the synthesis of human glycoproteins and other human glycomolecules (Murray et al, Chapter 56, Harper's Biochemistry, 25th ed., Exhibit B). Pre-digestion of carbohydrates to the monosaccharide level is necessary for this (see below). In none of the disclosures addressed above (Linscott, Montreuil, Citkowitz and Ortega) is there any hint or suggestion of formulating a human (or other) dietary supplement that provides the monosaccharides specified in the McAnalley Application. In fact, prior to the McAnalley Application, no one had ever suggested such a concept. Scientists in the field had assumed that dietary glucose would be sufficient to allow the synthesis of all the other sugars found in glycoproteins, so that giving the others was never even considered. In fact, that was my own belief when I included a Table in the 24th edition of Harper's Biochemistry (attached as Exhibit C) summarizing the eight major sugars detected in human glycoproteins. Many still believe that glucose is sufficient, although there is now considerable evidence to refute that. Thus, the concept of sugar supplementation as disclosed and claimed in the McAnalley Application is novel, non-obvious and quite revolutionary.

20. The eight major monosaccharides found in humans do not occur free in significant amounts in nature. They are present in glycoconjugates and must be liberated from them to be utilized in the body. This once again stresses the importance of pre-digestion to the monosaccharide level.

21. The major carbohydrates in the human di t are sucrose (contains glucose and

fructose), lactos (contains galactose and glucose) and starch (a polyglucan). Fructose is not found in glycoproteins. Therefore, the major human di tary carbohydrates provide only two of the eight principal sugars found in human glycoproteins. In my considered opinion, the McAnalley Application which describes and claims compositions of saccharides appropriate for the synthesis of the carbohydrate chains of glycoproteins and other glycomolecules is both highly novel and important for maintenance of human health.

22. Accordingly, I do not believe that any of Linscott, Montreuil, Citkowitz and Ortega, alone or in combination, discloses or suggests the invention of claims 1, 6-17, 22, 27-36 and 40-43 of the McAnalley Application since none of them disclose or suggest a composition that includes at least six of the saccharides specified in the claims of the McAnalley Application which are obtained by pre-digestion of complex carbohydrates as a suitable and appropriate dietary supplement for humans.

I acknowledge that willful false statements are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and may jeopardize the validity of this application or any patent issuing from it. I declare under penalty of perjury under the laws of the United States that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert K. Murray MD PhD

Robert K. Murray

Date April 14, 2003

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CURRICULUM VITAE

NAME: Robert Kincaid Murray

DATE OF BIRTH: December 18, 1932

CITIZENSHIPS: UK and Canada

UNIVERSITY EDUCATION:

1950-56: Medical School, University of Glasgow; Gradnated M.B., Ch.B.

1957-58: Dept. of Physiology, University of Michigan; Gradnated M.S.

1958-61: Dept. of Biochemistry, University of Toronto; Graduated Ph.D.

INTERNSHIP: 1956-57: Victoria Hospital, London, ON.

MEDICAL LICENCE: 1958: Passed LMCC Examination: Licensed to Practise in Ontario.

ACADEMIC APPOINTMENTS:

1961-65: Asst. Professor, Biochemistry, U of Toronto.

1965-68: Senior Post-Doctoral Fellow, Oncology & Pathology, U of Wisconsin (Madison).

1968-73: Assoc. Professor, Biochemistry, U of Toronto.

1968-98: Professor, Biochemsitry, U of Toronto.

1998-present: Professor (Emeritus), Biochemistry, U of Toronto.

1974-76: Co-ordinator, Basic Science Teaching to Medical Students, U of Toronto

TEACHING EXPERIENCE:

1961-98: Teaching Biochemistry to 1st year Medical Students, (except 1965-68).

1975-98: Course Co-ordinator, Biochemistry Course to 1st Year Medical Students.

TEACHING AWARDS:

Hollington Award, Medical Alumni, 1987 & 1998

Aikins Award, U of T Med Faculty, 1994

UNIVERSITY COMMITTEES:

Faculty of Medicine Representative on the Faculty of Arts & Science Faculty Council, 1974-76

Chairman, Graduate Committee, Dept. of Biochemistry, 1975-76.

Member, Faculty Council (Medicine) 1980-98.

Member Decanal Promotions Committee, Faculty of Medicine, 1980-82.

Member, Agenda Committee, Faculty of Medicine, 1980-82.

Member, Institute of Medical Science, 1980-98.

Member, U of T Tenure Appeal Committee, 1986-88.

Member, Task Force for Curriculum Renewal, 1991-92.

Member, Nominating Committee, Faculty of Medicine, 1992-94.

Member, CME Committee, Faculty of Medicine, 1993-96.

Member, Medical Education Committee, Faculty of Medicine, 1994-97.

GRAD. STUDENTS TRAINED:

(A) Ph.D.: G. Yogeeswaran (1972)
S. Chatterjee (1973)
D.J. Bailey (1974)
M. Behar-Bannelier (1980)
M. Levine (1981)
V. Chow (1984)
H. Sambasivam (1992)
M. Rassouli (1994)

(B) M.Sc: M. Maung (1965)
G. Yogeeswaran (1970)
P. Cheema (1971)
A. Knapp (1976)
H. D'Iorio (1981)

PROFESSIONAL SOCIETIES:

I formerly held membership in the following Societies, but I allowed my memberships to lapse prior to my retirement:
American Association for Cancer Research
American Society for Biochemistry & Molecular Biology
American Society for Cell Biology
American Society for Investigative Pathology
Biochemical Society
Canadian Biochemical Society.

PROFESSIONAL ACTIVITIES:

Member, Ontario Cancer Research Foundation Grants Panel on Biochemistry, 1972-79; Chairman, 1977-79.

Member, MRC of Canada Grants Committee on Cancer Research, 1973-75.

Member, MRC of Canada Grants Committee on Biochemistry, 1980-82.

Member, Biochemistry Panel, NCI of Canada, 1981-84.

Treasurer, Canadian Biochemical Society, 1982-84.

RESEARCH INTERESTS:

Biochemistry of glycolipids, glycoproteins, the endoplasmic reticulum and cancer.

PUBLICATIONS (Abstracts excluded):

1. Murray, R.K., Beck, L., Rondell, P.A. and Bohr, D.F. (1959) A study of the central action of ganglionic blocking agents. J. Pharmacol. & Exp. Therap. 127, 157-163.

2. Murray, R.K., and Connell, G.E. (1960) Elevation of serum haptoglobin in rabbits in response to experimental inflammation. Nature 186, 86.

3. Murray, R.K., Pert, J.H., and Connell, G.E. (1961) The role of haptoglobin in the clearance and distribution of extracorpuscular hemoglobin. Blood 17, 45-53.

4. Bishop, C.T., Cooper, F.P., and Murray, R.K. (1963) Reactions of carbohydrate derivatives during gas-liquid chromatography. Canad. J. Chem. 41, 2245-2250.

5. Kalant, H., Murray, R.K., and Mons, W. (1964) Effect of EDTA on leakage of proteins from slices of normal rat liver and DAB-hepatoma. Cancer Res. 34, 570-581.

6. Maung, M., Baker, D.G., and Murray, R.K. (1964) Effect of puromycin on the plasma haptoglobin level of rats during experimental inflammation. Life Sciences 3, 1349-1354.

7. Wasi, S., Uriuhara, T., Taichman, N.S., Murray, R.K., and Movat, H.Z. (1966) Proteolytic activity in the serum of rabbits during anaphylaxis. Experientia 22, 196-203.

8. Wasi, S., Murray, R.K., Macmorine, D.R.L., and Movat, H.Z. (1966) Studies on the proteolytic activity of PMN-leucocyte lysosomes of the rabbit. Brit. J. Exp. Path. 47, 411-423.

9. Murray, R.K., Kalant, H., Guttman, M., and Morris, H.P. Studies on the composition and leakage of proteins and esterases of normal rat liver and Morris hepatoma 5123 t.c. Cancer Res. 27, 403-411.

10. Maung, M., Baker, D.G., and Murray, R.K. (1968) Studies on the nature of the seromucoid and haptoglobin responses to experimental inflammation. Canad. J. Biochem. 46, 477-481.

11. Murray, R.K., Gadacz, I., Bach. M., Hardin, S., and Morris, H.P. (1969) Metabolic and electrophoretic studies of rat liver sorbitol dehydrogenase. Canad. J. Biochem. 47, 587-593.

12. Murray, R.K., and Temin, H.M. (1970) Carcinogenesis by RNA sarcoma viruses. XIV. Infection of stationary cultures with murine sarcoma virus-Harvey. Int. J. Cancer 5, 320-326.

13. Moyer, G.H., Murray, R.K., Khairallah, L.H., Suss, R., and Pitot, H.C. (1970) Ultrastructural and biochemical characteristics of endoplasmic reticulum fractions of the Morris 7800 and Reuber H-35 hepatomas. Lab. Invest. 23, 108-118.

14. Cheema, P., Yogeeswaran, G., Morris, H.P., and Murray, R.K. (1970) Ganglioside patterns of three Morris minimal deviation hepatomas. FEBS Letters 11, 181-184.

15. Yogeeswaran, G., Wherrett, J.R., Chatterjee, S., and Murray, R.K. (1970) Gangliosides of cultured cells: Partial characterization and demonstration of ^{14}C glucosamine incorporation. J. Biol. Chem. 245, 6718-6725.

16. Hudgin, R.L., Murray, R.K., Pinteric, L., Morris, H.P., and Schachter, H. (1971) The use of nucleotide-sugar:glycoprotein glycosyltransferases to assess Golgi apparatus function in Morris hepatomas. Canad. J. Biochem. 49, 61-70.

17. Yogeeswaran, G., Sheinin, R., Wherrett, J.R., and Murray, R.K. (1972) Studies on the glycosphingolipids of normal and virally-transformed 3T3 fibroblasts. J. Biol. Chem. 247, 5146-5158.

18. Kornblatt, M.J., Schachter, H., and Murray, R.K. (1972) Partial characterization of a novel glycerogalactolipid from rat testis. Biochem. Biophys. Res. Commun. 48, 1489-1494.

19. Yogeeswaran, G., Murray, R.K., Pearson, M.L., Sanwal, B.D., McMorris, F.A. and Ruddle, F.H. (1973) Glycosphingolipids of clonal lines of mouse neuroblastoma and neuroblastoma X L cell hybrids. J. Biol. Chem. 248, 1231-1239.

20. Knapp, A., Kornblatt, M.J., Schachter, H., and Murray, R.K. (1974) Studies on the biosynthesis of testicular sulfoglycerogalactolipid: Demonstration of a Golgi-associated sulfotransferase activity. Biochem. Biophys. Res. Commun. 55, 179-186.

21. Yogeeswaran, G., Murray, R.K., and Wright, J.A. (1974) Glycosphingolipids of wild-type and mutant lectin-resistant Chinese hamster ovarian cells. Biochem. Biophys. Res. Commun. 56, 1010-1016.

22. Narasimhan, R., Murray, R.K., and MacLennan, D.H. (1974) Presence of glycosphingolipids in the sarcoplasmic reticulum of rabbit skeletal muscle. FEBS Lett. 43, 23-26.

23. Kornblatt, M.J., Knapp. A., Levine, M., Schachter, H., and Murray, R.K. (1974) Studies on the structure and appearance during spermatogenesis of the sulfoglycer · galactolipid of rat testis. Canad. J. Biochem. 52, 689-697.

24. Sheinin, R., Yogeeswaran, G., and Murray, R.K. (1974) Synthesis of surface glycoproteins and glycosphingolipids in db-cAMP-treated normal and virus-transformed 3T3 cells. Exp. Cell Res. 89, 95-104.

25. Bailey, D.J., Murray, R.K., and Rolleston, F. (1974) Electrophoretic studies of the proteins of rat liver endoplasmic reticulum. Canad. J. Biochem. 52, 1003-1012.

26. Levine, M., Kornblatt, M.J. and Murray, R.K. (1975) Isolation and partial characterization of a sulfogalactoglycerolipid from rat brain. Canad. J. Biochem. 53, 679-689.

27. Narasimhan, R., Hay, J.B., Greaves, M.F. and Murray, R.K. (1976) Studies on th glycolipids of sheep thymus and of normal and concanavalin A-stimulated sheep peripheral lymphocytes. Biochim. Biophys. Acta 431, 578-591.

28. Levine, M., Bain, J., Narasimhan, R., Palmer, B., Yates, A.J., and Murray, R.K. (1976) A comparative study of the glycolipids of human, bird and fish testis and of human sperm. Biochim. Biophys. Acta 441, 134-145.

29. Cameron, R., Sharma, R.N., Sweeney, G.D., Farber, E., and Murray, R.K. A novel electrophoretic pattern of induction of rat liver microsomal membrane polypeptides by 2-acetylaminofluorene, nitrosamine and azo dye administration. Biochem. Biophys. Commun. 71, 1054-1061.

30. Revesz, T., Greaves, M.F. Capellaro, D., and Murray, R.K. (1976) Differential expression of cell surface binding sites for cholera toxin in acute and chronic lymphatic leukemias. Brit. J. Hematol. 34, 623-631.

31. Sharma, R.N., Behar-Bannelier, M., Rolleston, F.S., and Murray, R.K. (1978) Electrophoretic studies on liver endoplasmic reticulum membrane polypeptides and n their phosphorylation in vivo and in vitro. J. Biol. Chem. 253, 2033-2043.

32. Narasimhan, R., and Murray, R.K. Comparative study of the glycosphingolipids of chicken bursa of Fabricius and of chicken, rat and human thymus. Biochem. J. 173, 475-482.

33. Yousef, I.M., and Murray, R.K. (1978) Studies on the preparation of rat liver plasma membrane fractions and on their polypeptide patterns. Canad. J. Biochem. 56, 713-721.

34. Narasimhan, R., and Murray, R.K. (1979) Neutral glycosphingolipids and gangliosides of human lung and lung tumours. Biochem. J. 179, 199-211.

35. Murray, R.K., Sharma, R.N., Joly, J.-G., Cameron, R.G., and Farber, E. (1979) Multiple patterns of induction of rat liver microsomal monooxygenases and other polypeptides by xenobiotics. Trans. Biochem. Soc. 7, 32-34.

36. Behar-Bannelier, M., Sharma, R.N., and Murray, R.K. (1979) Suitability of L-(^{35}S) methionine for studying the biosynthesis of the polypeptides of mouse liver endoplasmic reticulum fractions in vivo. Canad. J. Biochem. 57, 625-638.

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39. Behar-Bannelier, M., and Murray, R.K. (1980) An electrophoretic study of endogenous in vitro phosphorylation of the polypeptides of microsomal membrane fractions of mouse liver. Biochem. J. 187, 147-156.

40. Lingwood, C.A., Murray, R.K., and Schachter, H. (1980) The preparation of rabbit antiserum specific for mammalian testicular sulfogalactoglycerolipid. J. Immunol. 124, 769-774.

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42. Sharma, R.N., Gurtoo, H.L., Farber, E., Murray, R.K., and Cameron R.G. (1981) Effects of hepatocarcinogens and hepatocarcinogenesis on the activity of rat liver microsomal epoxide hydrolase and observations on the electrophoretic behavior of this enzyme. Cancer Res. 41, 3311-3319.

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46. Hsu, L.-H., Narasimhan, R., Levine, M., Norwich, K.H., and Murray, R.K. (1983) Studies of the biosynthesis and metabolism of rat testicular galactoglycerolipids. Canad. J. Biochem. 61, 1272-1281.

47. Chow, V., Kurosky, A., and Murray, R.K. (1984) Studies on the biosynthesis of rabbit haptoglobin. J. Biol. Chem. 259, 6622-6629.

48. Rushmore, T.H., Sharma, R.N., Roomi, M.W., Harris, L., Satoh, K., Sato, K., Murray, R.K., and Farber, E. (1987) Identification of a characteristic cytosolic p ly-peptide of rat preneoplastic hepatocyte nodules as placental glutathione S-transferase. Biochem. Biophys. Res. Commun. 143, 98-103.

49. Rushmore, T.H., Harris, L., Nagai, M., Sharma, R.N., Hayes, M.A., Cameron, R.G., and Farber, E. (1988) Purification and characterization of P-52 (glutathione S-transferase-P or 7-7) from normal liver and putative preneoplastic liver nodules. Cancer Res. 48, 2805-2812.

50. Sambasivam, H., and Murray, R.K. (1988) A comparison of acetylation in vitro of microsomal, homogenate and Golgi fractions of rat liver. Biochem. Cell Biol. 66, 1152-1161.

51. Dratewka-Kos, E., Rahman, S., Grzelczak, Z.F., Kennedy, T.D., Murray, R.K., and Lane, B.G. (1989) Polypeptide structure of germin as deduced from cDNA sequencing. J. Biol. Chem. 264, 4896-4900.

52. Rassouli, M., Sambasivam, H., Azadi, P., Dell, A., Morris, H.R., Nagpurkar, A., Mookerjea, S., and Murray, R.K. (1992) Derivation of the amino acid sequence of rat C-reactive protein from cDNA cloning with additional studies on the nature f its dimeric component. J. Bi l. Chem. 267, 2947-2954.

53. Sambasivam, H., Rassouli, M., Murray, R.K., Nagpurkar, A., Mookerjea, S., Azadi, P., Dell, A., and Morris, H.R. (1993) Studies on the carbohydrate moiety and on the biosynthesis of rat C-reactive protein. J. Biol. Chem. 268, 10007-10016.

TEXTBOOK:

Harper's Biochemistry. 21st, 22nd, ~~and~~ 23rd editions, by Murray, R.K., Granner, D.G., Mayes, P.A., and Rodwell, V.W. (1988, 1990 ~~and~~ ,1993). Appleton & Lange. ~~24th edition in preparation.~~

ARTICLES IN BOOKS:

1. Maung, M., Baker, D.G., and Murray, R.K. (1965) Effects of inhibitors of protein synthesis on the plasma and seromucoid levels of rats during inflammation. In "Studies of Rheumatoid Disease". University of Toronto Press, 268-273.

2. Movat, H.Z., Uriuhara, T., Murray, R.K., Macmorine, D.R.L., Wasi, S., Taichman, N.S. and Franklin, A.E. (1965) In vivo and in vitro studies on the role of PMN leucocyte granules in immediate hypersensitivity. In "Studies of Rheumatoid Disease". University of Toronto Press, 116-133.

3. Murray, R.K., Suss, R., and Pitot, H.C. Cytoplasmic components of cancer cells. Methods of Cancer Res. Vol. 2, 239-286.

4. Murray, R.K., Khairallah, L., Ragland, W., and Pitot, H.C. (1968) The biochemical morphology and morphogenesis of rat hepatomas. Internat. Rev. Exp. Pathol. 7, 229-283.

5. Pitot, H.C., Sladek, N., Ragland, W., Murray, R.K., Moyer, G., Soling, H.D., and Jost, J.P. (1969) A possible role of the endoplasmic reticulum in the regulation of genetic expression. In "Microsomes and Drug Oxidations". Academic Press, 59-79.

6. Sheinin, R., Onodera, K., Yogeeswaran, G., and Murray, R.K. (1971) Studies of the components of the surface of normal and virus-transformed mouse cells. In "The biology of oncogenic viruses", 2nd le Petit Symposium. American Elsevier, 274-285.

7. Murray, R.K., Bailey, D.J., Hudgin, R.L., and Schachter, H. (1972) Enzymes and heteroglycan metabolism of hepatomas. Gann Monograph on Cancer Research 13, 167-180.

8. Murray, R.K., Chatterjee, S., and Yogeeswaran, G. (1973) Glycosphingolipids, cultured cells and neoplastic transformation. PAABS Revista 2, 721-728.

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